

2006 CCRTS

THE STATE OF THE ART AND THE STATE OF THE PRACTICE

**Organizing on the Edge:
Appreciation and Critique**

Topics: Concepts and Organizations

W. Richard Scott

Department of Sociology

Stanford University

Stanford, CA 94305

Telephone: 650 857 1834

FAX: 650 725 6471

scottwr@stanford.edu

Report Documentation Page			Form Approved OMB No. 0704-0188		
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE JUN 2006		2. REPORT TYPE		3. DATES COVERED 00-00-2006 to 00-00-2006	
4. TITLE AND SUBTITLE Organizing on the Edge: Appreciation and Critique				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Stanford University, Department of Sociology, Stanford, CA, 94305				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES 2006 Command and Control Research and Technology Symposium					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES 17	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

Organizing on the Edge:

Appreciation and Critique

W. Richard Scott

Stanford University

Abstract

The paper begins with a summary of Alberts and Hayes's concept of edge organizations, noting its distinguishing features. Limitations and shortcoming are identified. The critique broadens to include a discussion of the limited perspective on organizations utilized, the neglect of attention to edge forms in nonmilitary settings, inattention to the relevance of the institutional environment within which the military operates, and the failure to consider the difficulties of inducing radical change in existing, entrenched organizations.

Introduction

I am part of a team of researchers that is collaborating with a number of scholars affiliated with the Center for Edge Power, headquartered at the Naval Postgraduate School. Our project stems from an effort stimulated by the recent work of David S. Alberts and Richard E. Hayes, *Power to the Edge: Command, Control in the Information Age* (2003). While a number of my colleagues are productively investigating one or another process or facet associated with these concepts and arguments, in this paper, I embrace a somewhat more critical posture. It seems important to me that we place the “edge” perspective in the broader context of organizational studies, noting both its strengths and limitations.

After briefly describing and commenting on the concept of edge organizations, I raise a number of questions and concerns which I believe need to be addressed in order to render the approach more usable.

Edge Organizations

The Concept of Edge

Alberts and Hayes have produced a thought-provoking and valuable set of arguments regarding the limitations of “industrial age” organizations and the necessity, given current conditions, to consider new ways of organizing. Since their primary interest is in reshaping military organizations, they understandably strongly emphasize the ways in which our world has changed in its security concerns since 9/11. Given a world containing non-state enemy forces operating around the globe in clandestine networks, standing armies and fixed fortifications appear increasingly outdated and ineffective.

Although they give insufficient attention to related changes in the world of civilian organizations, Alberts and Hayes do recognize that all organizations, not just the military, are confronted by new challenges that render older structures inadequate.

In parsing the concept of “edge” organization, it seems important to emphasize that Alberts and Hayes’s formulation emphasizes structural features at two levels: (1) that of the individual organization and (2) that of a “system” of collaborating organizations. Each level is briefly reviewed:

Edge Organizations

Distinguishing features. While no single, succinct definition of “edge” organization is provided, the authors discuss a series of characteristics among which, to my mind, the following are primary:

- *Distributed information*

The driving force behind the edge model is the dawning of the “information age” with its changing “economics of information” especially the rise of information processing enablers in the new forms of information and computer technologies (ICT). Indeed, in one of the strongest sections of their volume, Alberts and Hayes detail improvements in reach, richness, and quality of interactions as ICT has moved from telephone, to broadcast, to electronic-mail, to “fully-networked” collaborative technologies (chap. 5).

- *Collective sensemaking*

To their credit, the authors do not equate “information” with understanding or knowledge (see also, Nissen, 2006). They recognize that information must be interpreted and contextualized to be useful. Moreover, they recognize that to do so adequately requires “a wide variety of expertise and perspectives (to understand, filter, and integrate the available information and knowledge)” (Albert & Hayes, 2002, 74). A good deal of effort must be devoted to sense-making.

- *Distributed power*

If information is widely distributed, then so must power be widely distributed. “Edge organizations are characterized by the widespread sharing of information and the predominance of peer-to-peer relationships. . . In an edge organization, virtually everyone is at the edge because they are empowered.” (p. 176) Leadership becomes “situational”: who “takes charge” will vary by the characteristics of the situation and the individual (p. 184). The degree of centralization of command and control (C2) functions varies by task (chap. 2).

- *Dynamic task allocation*

Rather than a rigid system of task assignment accompanied by intense specialization, edge organizations are marked by greater redundancy of training and broader skill-sets.

- *Shared understanding of command intent*

C2 continues to play a crucial role, but C2 are viewed as functions, the distribution of which varies over place and time. C2 responsibilities vary by situation and are dependent on the nature of the tasks to be performed. (p. 17)

The aim or purpose of all of the above features is to improve the response capabilities of the military, to promote *agility*, so that response options will be available to meet varying circumstances (chap. 6). The arguments are fundamentally based on a contingency theoretic view of organizations (Lawrence and Lorsch, 1967; Thompson, 1967).

Collaborating Systems

One level up, edge organizations must be able to fold themselves into varying combinations of collaborative systems, not only across functional departments within a single organization but across diverse types of organizations—e.g., various branches of the military (joint forces), “coalition elements, interagency partners, international organizations, and nongovernmental organizations” (Alberts & Hayes, 2003, p. 16).

This capability, in turn, requires:

- *A robustly networked force*

Collaborating units need to be richly connected to a communications network and utilizing common languages (or translations) and similar cognitive frames allowing shared sense making and interpretation. To overcome information overload, participants utilize a “post and smart pull approach” in which participants have available all necessary information and know how to access it as required by the changing situation (p. 118).

- *Network-centric joint action*

Rather than relying on fixed and stable “platforms” to coordinate joint action, systems comprised of edge organizations generate shifting nodes in the network—“dynamic reconfigurable packs, swarms, or other organizations of highly specialized components that work together” as required (p. 169).

This brief summary of what I see as the central ideas and arguments does not of course do justice to a much more elaborated set of arguments by Alberts and Hayes as they set forth a new organizational model. The existing relatively rigid and hierarchical model is seen as hopelessly outdated given (1) the new types of unpredictable, nonconventional challenges faced by today’s military and (2) the new kinds of information and computer technologies and capabilities available to support more flexible organizational forms. In short, the argument is fueled by the combination of new types of demands and tasks to be performed as well as the availability of new technologically enabled capabilities.

Concerns Raised by Edge Organizations Concepts and Arguments

Staying within the conceptual framework developed by Alberts and Hayes, I begin by briefly noting some limitations or concerns:

- *Every organization an edge organization?* The argument appears to be that every unit or component of the military needs to become more edge-like—that

is, develop these capabilities—even though the range of tasks and challenges faced by different units varies greatly. Do all units need to edge-like or only a sub set that is confronting the new types of challenge?

- *Cognitive limits?* From Simon (1945) up to the present, organization theorists have recognized that an important function of organizations is to help to overcome the cognitive limits of each of their members. They do this by subdivision of complex tasks, specialization of personnel, and designing communication and training systems to support informed decision making. Apart from the human limits of cognitive capacity and calculating skills, March (1988), among others has emphasized the extent to which time and attention are scarce resources and thus have large effects on decision making. Given the continued existence of such limits, is the edge concept realistic?
- *Conflict?* No attention is given to the existence of conflict, across persons, organizational subunits, organizations, countries. Power receives attention only as influence, the ability to make things happen (p. 166). Power differences tied to differences in interests or objectives is not considered. Shouldn't the likelihood of conflicts among units be explicitly considered?
- *Security?* Particularly in a military context, the lack of attention to issues of security is surprising. The highly sensitive nature of much of the information transmitted and associated differences among personnel in privilege or access is not discussed. Much of the information that would better inform actors in changing situations is classified, and thereby, unavailable. Is the edge model consistent with a high security environment?
- *Vulnerabilities?* Edge organizations are argued to have distinctive capabilities. Have they no inherent weaknesses? Again, in a military context, the open and

free-floating nature of information exchange would appear to present serious security problems. We learn about the purported strengths of edge organizations. What are their distinctive vulnerabilities?

Finally, and more generally, the use of the “edge” metaphor seems misleading. In the early stages of the discussion, it appeared that those participants at the boundaries of their organizations—those in contact with relevant environmental changes—would become empowered based on their first-hand knowledge of the situation. But later, we learn that: “In an edge organization, virtually everyone is at the edge because they are empowered” (p. 176). In short, edge does not refer to edge in any conventional sense, but rather refers to a richly interlinked, empowered collection of mission-oriented actors.

Broadening the Critique

Next, I want to widen the scope of my comments to discuss matters that I think are highly relevant to thinking about edge organizations, but which, at least in the book under discussion, are hardly mentioned or completely ignored. I briefly discuss four types of issues: (1) lack of attention to human/social issues; (2) inadequate attention to nonmilitary organizations; (3) insufficient attention to the wider environment in which military organizations operate; and (4) lack of consideration of the problems associated with organizational change.

Rational vs. Natural System Perspectives

As a long term student of organizations, I have examined the intellectual context within which the modern field of organizational studies came together. The early history of the field, at the beginning of the 20th century, was dominated by engineers like Frederick W. Taylor (1911), who were concerned to improve the technical design of organizations beginning with the rationalization of individual worker’s tasks and moving up to higher levels of coordination, planning and control systems. During the late 1930s

and 1940s, in reaction to these technocratic views, social psychologists and sociologists began to conduct studies in factories and offices, focusing attention on human problems such as motivation and morale and social factors such as informal organization, shared norms, and conflicts (e.g., Mayo, 1945; Homans, 1950). Hence, at the time the field of organization studies began to coalesce as an academic specialty, during the 1950s, efforts were made to include both of these foundational elements, forming as it were a “cleft rock” (Scott 2004) to support the fledgling field. As the discipline began to develop, these two emphasizes became institutionalized as a kind of dualism, one branch emphasizing a set of “rational system” elements—organizations as technical instruments designed to achieve specified objectives—and the other, a set of “natural system” elements—organizations as human and social systems concerned with their own survival (Gouldner 1959; Scott 2003).

The contemporary heirs of these two traditions are still with us. Current rational system approaches include design and contingency theorists—the camp that includes Alberts and Hayes (see also, Burton and Obel, 2004)—transaction cost economists (e.g., Williamson 1985), and knowledge-based theorists (e.g., Nonaka and Takeuchi, 1995; Nissen, 2006). Currently active schools utilizing the natural system perspective include resource dependence (Pfeffer and Salancik 1978), population ecology (Hannan and Freeman, 1989); and institutional theory (DiMaggio and Powell, 1983).

The current relevance of all this is to underline the point that *Power to the Edge* rests within a rational system perspective that privileges technical problems and solutions and, as a consequence, severely neglects relevant natural system concepts and arguments. Among the missing or barely mentioned features that must be taken into account in designing, operating, or researching edge organizations are:

- *Recruitment, composition of the work force*

The types of information processing, multi-skilled, sense-making participants described seem remote from the kinds of under-skilled, under-educated military personnel currently being recruited.

- *Training*

When one thinks about the structure and emphasis of current training programs—e.g., boot camp—their focus on discipline, unquestioning obedience to orders, and strict adherence to routine seems to be at the far end of the training continuum from edge organization requirements

- *Incentives*

Current incentives reinforce obedience, keeping one's head down, unquestioned compliance to rules and orders rather than taking initiative, acknowledging and correcting mistakes, or organization learning.

- *Culture*

Alberts and Hayes refer here and there to the importance of a supportive “culture”—one that encourages learning and fosters trust among shifting networks of players, but there is no detailed consideration of the nature of this culture or how to create it. But clearly a different culture from the one that currently pervades military organizations is essential to the functioning of edge organizations.

Since more conventional means of C2—hierarchy, specialization, discipline—are to be jettisoned, it becomes all the more important to cultivate the “softer” forms of organizing people to meet changing demands. Culture, trust, broadened training to support increased discretion and flexibility—these modes of control have been examined by a wide variety of social scientists (e.g., Kunda, 1992; Martin, 2002; Ouchi, 1981; Trice and Beyer, 1993; Schein, 1992). The wider organization literature contains much work—and some wisdom—on all of these and related topics which pertain to the human and social elements of organizations.

The Relevance of Non-military Organizations

Alberts and Hayes do not begin to exploit the considerable organizational literature that currently exists on edge-like organizations, including studies of temporary teams and task forces, communities of practice, outsourcing, delaying, alliances, network forms, and virtual organizations (e.g., Brown and Duguid, 1991; Child 2005; DiMaggio, 2001; Smith-Doerr and Powell, 2005). Without question, the best examples of such networked organizations, and the best studies of the emergence of such forms exist outside the military context. While they acknowledge that the problems examined are “not unique to the military domain” (p. 6), they devote surprisingly little attention to examples and studies of nonmilitary organizations.

In one brief sentence, Alberts and Hayes assert that “warfare is qualitatively different from the management of other human enterprises by virtue of its time criticality and the high cost of error” (p. 13). I believe that many private organizations would dispute the first criterion, pointing out that in meeting changing market demands successfully, time is of the essence. Similarly, with regard to the second, “high costs of error” exist for many types of enterprises, from rail, transportation, and shipping companies to energy providers and financial institutions. The military is (somewhat) unique in its monopoly of violence, although even here, we witness the existence of increasing numbers of private security forces (Edelman and Suchman, 1999) and the use of private companies, such as Halliburton, to supplement military forces in combat zones. In short, it seems to be ever more difficult to find criteria to clearly distinguish military from non-military sectors and functions. All the more reason, then, to employ and exploit the full range of organizational experience and organizational research to examine factors affecting the success of edge-type forms.

Neglect of Wider Environment

In addition to the “rational-natural” distinction noted above, researchers have long attended to differences between a “closed” and “open” system approach to organizational structures and functioning (Scott 2003). While Alberts and Hayes acknowledge the challenge to current military units from changing environmental conditions, they do not begin to exploit the full range of insights available from more open system perspectives, in particular institutional theory.

Institutional theorists remind us that organizations operate not simply in a technical, resource-scarce world, but also in a social and symbolic world in which organizations are crafted out of available schemas and scripts, invested with meaning, and must attend to wider systems of rules, norms, and widely-shared cultural beliefs (Scott 2001). These institutional frameworks work to both constrain and to empower organizations. The frameworks vary over time and space—across regions and countries.

First, in terms of constraints, there are serious restrictions imposed on the military by wider political structures, especially in liberal democracies, on where discretion can be exercised and who is held accountable. Fleet-footed, free-wheeling “nodes” of shifting coalitions of actors, may not be able to respond rapidly to developing crisis situations because of legal and political restrictions and safeguards. Pentagon officials hauled before congressional hearings may not be sympathetic to actions taken in which they, as “responsible” oversight officers, have had no say. The “chain-of-command” is not so much about who makes the decision as about who is accountable for the decisions made. Military systems in less democratic societies may be less accountable to civilian political leaders, but nevertheless higher echelons must attend to managing the balance between control and responsibility.

With respect to empowerment, there is no question that, as noted above, the vocabulary of legitimate conceivable organizational forms has been vastly extended

during the past few decades. Many “new” organizations have shed the time-honored hierarchical forms for flatter, more egalitarian modes of operation. In the for-profit world, competition has forced such changes on reluctant organizations. In the military world, new kinds of enemies—nonconventional forces, networked cells, gorilla bands—operating in new ways both compel nonconventional responses and provide new models for organizing from which we can learn.

The Difficulties of Engendering Organizational Change

Mostly because of the efforts and insights associated with the population ecology perspective, organization theorists have learned two valuable lessons about organizational change. First, we have learned that organizational change is costly, difficult, even dangerous for existing organizations attempting to adapt to new circumstances. The same factors that contribute to the durability and reliability of organizations—trained and experienced workers, settled work routines, dedicated equipment, stable ties to suppliers and customers—prevent speedy change or rapid adaptation to a new environment. It is for this reason that, second, radical, in contrast to incremental organization change, occurs most often not because of changes in existing organizations but through the creation of new types of organizations. (Hannan and Freeman 1989; Tushman and Anderson, 1986) It was not GE or Westinghouse, established firms in the electronics industry that were able to capture and master the new semi-computer technologies, but a new collection of firms—Apple, Microsoft—giving rise to a new industry (Saxenian, 1994)

Based on my understanding of organizational change, I would venture the prediction that the radical kinds of transformations envisioned for the military by Alberts and Hayes in their work on edge organizations are unlikely to ever be successfully adopted by existing military organizations. It will require the creation of new kinds of

units supported by new kinds of training, personnel, and deployment systems, not simply new technologies.

Concluding Comment

The overall tone of my paper is no doubt overly critical. While I do see shortcomings and limitations in Alberts and Hayes work on edge organizations, I also see much merit in their effort to propose a new model of organizing for (at least some) military operations. They deal thoughtfully with the implications of the new ICT capabilities and point out their implications for rethinking and designing supportive structural changes. They push our understanding and discussion along in a positive direction.

My comments are not meant to undercut but rather to supplement and, hopefully, enlarge our discussion. I believe that the edge model has limitations, which can be remedied. In particular, more attention must be devoted to the human and social elements of edge organizations as well as to the wider social and cultural environments within which all organizations, including military, function. And, we need to think through the difficulties of implementing radical change initiatives, developing an appropriate strategy to support successful reforms.

References

Alberts, Davis S., and Richard E. Hayes 2003. *Power to the Edge: Command, Control in the Information Age*. Department of Defense Command and Control Research Program, Washington, DC.

- Brown, John Seeley, and Paul Duguid 1991. "Organizational learning and communities-of-practice: Toward a unified view of working, learning, and innovation," *Organization Science* 2:40-57.
- Burton, Richard M., and Borge Obel, 2004. *Strategic Organizational Diagnosis and Design: The Dynamics of Fit*. Boston: Kluwer Academic.
- Child, John 2005. *Organization: Contemporary Principles and Practice*. Oxford, UK: Blackwell.
- DiMaggio, Paul J., ed. 2001. *The Twenty-First-Century Firm: Changing Economic Organization in International Perspective*. Princeton, NJ: Princeton University Press.
- DiMaggio, Paul J., and Walter W. Powell 1983. "The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields," *American Sociological Review* 48:147-60.
- Edelman, Lauren B., and Mark C. Suchman 1999. "When the 'haves' hold court: Speculations on the organizational internalization of law," *Law and Society Review* 33:941-991.
- Gouldner, Alvin W. 1959. "Organizational analysis," in *Sociology Today*, 400-28, ed. Robert K. Merton, Leonard Broom, and Leonard S. Cottrell, Jr. New York: Basic Books.
- Hannan, Michael T., and John Freeman, 1989. *Organizational Ecology*. Cambridge: Harvard University Press.
- Homans, George C. 1950. *The Human Group*. New York: Harcourt.
- Kunda, Gideon 1992. *Engineering Culture: Control and Commitment in a High-Tech Corporation*. Philadelphia: Temple University Press.

- Lawrence, Paul R., and Jay Lorsch 1967. *Organization and Environment: Managing Differentiation and Integration*. Boston: Graduate School of Business Administration, Harvard University.
- March, James G. 1988. *Decision and Organizations*. Oxford, UK: Basil Blackwell.
- Martin, Joanne 2002. *Organization Culture: Mapping the Terrain*. Thousand Oaks, CA: Sage.
- Mayo, Elton 1945. *The Social Problems of an Industrial Civilization*. Boston: Graduate School of Business Administration, Harvard University
- Nissen, Mark E. 2006. *Harnessing Knowledge Dynamics: Principles Organizational Knowing and Learning*. Heershey, PA: IRM Press.
- Nonaka, Ikujiro, and Hirotaka Takeuchi 1995. *The Knowledge-Creating Company*. New York: Oxford University Press.
- Ouchi, William G. 1982. *Theory Z*. Reading, MA: Addison-Wesley.
- Pfeffer, Jeffrey, and Gerald R. Salancik 1978. *The External Control of Organizations*. New York: Harper & Row.
- Saxenian, Annelee 1994. *Regional Advantage: Culture and Competition in Silicon Valley and Route 128*. Cambridge, MA: Harvard University Press.
- Schein, Edgar H. 1992. *Organizational Culture and Leadership*. San Francisco: Jossey-Bass, 2nd ed.
- Scott, W. Richard 2001. *Institutions and Organizations*. Thousand Oaks, CA: Sage, 2nd ed.
- Scott, W. Richard 2003. *Organizations: Rational, Natural, and Open Systems*. Upper Saddle River, NJ: Prentice-Hall, 5th ed.
- Scott, Richard 2004. "Reflections on a half-century of organizational sociology," *Annual Review of Sociology* 30:1-21.

- Smith-Doerr, Laura, and Walter W. Powell. 2005. "Networks and economic life," in *Handbook of Economic Sociology*, 379-402, ed., Neil J. Smelser and Richard Swedberg. Princeton, NJ and New York: Princeton University Press and Russell Sage Foundation
- Taylor, Frederick W. 1911. *The Principles of Scientific Management*. New York: Harpers.
- Thompson, James D. 1967. *Organizations in Action*. New York: McGraw-Hill.
- Trist, Harrison M., and Janice M. Beyer 1993. *The Cultures of Work Organizations*. Upper Saddle River, NJ: Prentice-Hall.
- Tushman, Michael L., and Philip Anderson 1986. "Technological discontinuities and organizational environments," *Administrative Science Quarterly* 31:439-65.
- Williamson, Oliver E. 1985. *The Economic Institutions of Capitalism*. New York: Free Press.